SPANISH FOREST MAP AND NATIONAL FOREST INVENTORY

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## 1. General Characterization of the Different Cycles.

### Spanish NFI Summary

<table>
<thead>
<tr>
<th>Inventory</th>
<th>Years</th>
<th>Stratification</th>
<th>Sampling method and field plots</th>
<th>Number of plots</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFI 1</td>
<td>1965-1974</td>
<td>Grid over photographs</td>
<td>Optimal allocation of plots, temporary plots</td>
<td>65,000</td>
</tr>
<tr>
<td>NFI 2</td>
<td>1986-1995</td>
<td>Grid over maps</td>
<td>Systematic 1 x 1 km grid, permanent plots</td>
<td>84,203</td>
</tr>
<tr>
<td>NFI 3</td>
<td>1997-2007</td>
<td>Grid over digital maps</td>
<td>Same systematic grid as NFI2, permanent plots</td>
<td>95,327</td>
</tr>
<tr>
<td>NFI 4</td>
<td>2008 - currently</td>
<td>Grid over digital maps</td>
<td>Same systematic grid as NFI3, permanent plots</td>
<td>NA</td>
</tr>
</tbody>
</table>

Repeated plots
2. GENERAL SCHEME. SPANISH NATIONAL FOREST MAP (SNFM) AND NATIONAL FOREST INVENTORY (NFI) RELATIONSHIP

SNFM

CREATE

LAND USE MAP

DATA AND INFORMATION IMPROVEMENTS

RESULTS

OBTAIN

DATA PROCESSING

CARRY OUT

DATA COLLECTION (PERMANENT FIELD PLOTS)

SELECT

STRATA DEFINITION

FOREST LAND

SHRUBL. & GRASSL.

WATER BODIES

SETTLEMENTS

CROPLAND

NFI SAMPLE

SELECT

CONDUCT

NFI data plots verify and enhance SNFM

Extrapolation of NFI data to SNFM surfaces (Strata)

NFI Sampling's selection

NFI-SNFM Interconnection

RETOS Y APLICACIONES DE LOS INVENTARIOS FORESTALES
Desafíos e aplicaciones dos inventários florestais

Madrid, 11/06/2019
3. NFI CARTOGRAPHY: SPANISH NATIONAL FOREST MAP (SNFM)

**MAIN CHARACTERISTICS:**

- Photo-interpretation of all the national territory (1ha resolution).
- Tessera delimitation based on the different land use and input data.
- Field visits: 10% tessera (MFE 25) at least

**FOREST LAND - INPUT DATA:**

- Tree species composition
- Canopy cover
- Artificial age classes
  (young growth; thicket; polewood; high forest)
- Forest fire combustible models

**OWL - INPUT DATA:**

- National shrub formation
- Shrub cover and estimated average height
3. NFI CARTOGRAFY: SPANISH NATIONAL FOREST MAP (SNFM)

PROVIDED INFORMATION:

- Tree and shrub crown cover
- Land use: Forest, Plantation, Dehesa, Temporarily unstocked forest land (Fires, Tree felling area, Natural felling area), Small forest stands, Linear stands, Riparian forest, Mosaics. In relationship to land cover. Describes the vegetation structure in forest and other wooded land.
  - Main cover/use (structural type)
  - Cover of rest of uses (≥10%)
- Stand structure (uniform, patches, strip, irregular…)
- Species: Up to 3 main species: Sp1; Sp 2; Sp3
- Relative crown cover: From 1-10. It is possible to deserve 2 for the rest of species (Sp4..): O1, O2, O3
- Stand stage/Artificial stage age (regeneration, thicket, pole wood and high forest)
- Forest type
  - Conifers, Broadleaves, mixed forest
  - National Forest classification. Different kinds of forest using a classification developed to describe Spanish forests.
- Land cover class
- Shrub types (new)
- Fuel model (new)
3. NFI CARTOGRAPHY: SPANISH NATIONAL FOREST MAP (SNFM)

CURRENT STATUS: MOST UPDATED SNFM (for each province)

Spanish Forest Map to the scale 1:25,000 (SFM 25)

LEGEND:
- MFE25 completed
- MFE25 in process
- MFE25 provisional draft
- MFE50

SFM 25
Forest Statistics and Inventory Unit
Rural Development, Innovation and Forest Policy
General Directorate

DATE: June 2019
UTM projection: WGS84 Zone 30N

Gobierno de España
Ministerio de agricultura, Pesca y Alimentación

Retos y aplicaciones dos inventários florestais
Madrid, 11/06/2019
4. SAMPLING DESIGN. STRATIFICATION

Sampling unit: province
4. SAMPLING DESIGN. STRATIFICATION

STRATIFICATION “A POSTERIORI”

PLOT LEVEL INPUT DATA:

• National forest types:
  • Ecological forest types (floodplain forest)
  • Man-made open forest stands (dehesas, resin tapping stands)
  • Productive plantation
  • Alien/native species

• Forest stand categories:
  regeneration, thicket, pole wood and high forest

• Tree species composition

• Crown cover

• Management regime (dehesas, reforestations, forestation….)
5. SAMPLE PLOTS

- **Permanent plots** (permanently marked by metallic tube)

- **Concentric sampling plots**: four circular concentric fixed areas with radius 5 (DBH ≥ 7.5 cm), 10 (DBH ≥ 12.5 cm), 15 (DBH ≥ 22.5 cm) and 25 m (DBH ≥ 42.5 cm). 5 m radius; trees with DBH between 2.5 and 7.4 cm are counted.

- **Field data**: including plot identification, forest type, trees mensuration, sample tree data, shrub, erosion factors and tree damages.
6. BIODIVERSITY SURVEY

More than 45,000 plots by now (aprox. 75% of the total)

FOREST STRUCTURE

VEGETATION SPECIES

Invasive exotic species survey
6. BIODIVERSITY SURVEY

DEAD WOOD

DENDROLOGY

HERBIVORES BROWSING IMPACT

Retos y aplicaciones de los inventarios forestales
Desafios e aplicações dos inventários florestais

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Retos y aplicaciones de los inventarios forestales

Species Density: Invasive Exotic Species; Protected Species

Trees R: 10m
Shrubs R: 5m
Herbaceous R: 1m

Dead Wood R: 15 m

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Trees R: 10m
Shrubs R: 5m
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PLOT STAND STRUCTURE (depending on the plot density)

Stand Naturalness R: 25m (Tessera)

Singular Elements R: 25m

Plot Age R: 25m

Browsing Impact . Regeneration (R=5)

Plot Coverages (bare soil…)
R: 10m

Non Trees Species Cover by Classes. R: 10m

Browsing Impact (R=10)

Dead Wood R: 15 m

PLOT COVERAGES (bare soil…)
R: 10m

Non Trees Species Cover by Classes. R: 10m

Browsing Impact (R=10)
7. NEW IMPROVEMENTS NFI4

WHAT IS NEW IN THE NFI4/SFM25?

1. CARTOGRAPHY

- Quick review (Foto Fija), updated each 3 years (2009, 2012 and 2015 available, next 2018)
- New strata definition: which will homogeneity provincial and national strata
- Since 2017, starting integrated process with LPIS

2. IMPROVEMENTS IN NFI SURVEY

- NFI. Minimize to a half the cycle in the atlantics provinces (North of Spain). New measurements in order to estimate wood quality
- Improvement of the biodiversity survey
- Improvement of other special parameters: resin, pine cones, cork
7. NEW IMPROVEMENTS NFI4

CARTOGRAPHY: Quick review SNFM (Foto Fija)

International and national information requirements: time referred (1 year).
Need to have a yearly map. Drastic anthropic changes are analyzed by photo interpretation:

- **Deforestation**: analysis of the intersect MFE-SIGPAC
- **Forestation/afforestation**: analysis of information provided by autonomous regions
- **Wild forest fires**: analysis of the information provided by the Ministry and autonomous regions
- **Tree-fellings** (partial information)

The natural dynamic of forest-land has not be studied in this project by the moment.

**PRODUCTS**

- Change shape
7. NEW IMPROVEMENTS NFI4
FOREST INVENTORY FOR NORTH ATLANTIC PRODUCTIVE SPECIES

5 year cycle. Started in 2017, definitive results are expected soon

2500 plots
More than 1 Million hectares

• Scope:
  • 4 atlantic autonomous regions: Galicia, Asturias, Cantabria, Basque country
  • Species: *Eucalyptus sp*, *Pinus radiata*, *Pinus pinaster* and their mixtures

• Cartography and field information

• Parameters:
  • Only dasometric measurements (no biodiversity)
  • New parameters in order to estimate Wood quality
  • Genetic studies about provenance of *Pinus pinaster* and *Pinus radiata* (100 plots)
7. NEW IMPROVEMENTS NFI4

IMPROVEMENT OF OTHER SPECIAL PARAMETERS

RESIN (PINUS PINASTER)

- AIM: Estimate resin potential and real productivity
- New methodology of field survey, measuring new parameters

PINE CONES (PINUS PINEA)

- AIM: Estimate potential and real productivity
- How many Pinus pinea forests are exploited
- New methodology of field measuring new parameters
- Prediction models of pine cones production

CORK (QUERCUS SUBER)

- AIM: Estimate potential and real productivity
- New methodology of field measuring new parameters
7. HARMONIZATION NEEDS

Several initiatives (ENFIN)

COST ACTIONS: E43 /USEWOOD

Specific Contracts (JRC)

DIABOLO (H2020)

http://diabolo-project.eu/
Main results achieved in WP3

Methods, indicators and/or protocols using NFIs as data source to improve the forest information:

1. Recommendations for harmonized forest biodiversity and conservation assessment in Europe
2. Improvement of the availability and quality forest information of specific non-wood forest products production
3. Recommendations of the priorities for the future refinement and inclusion of social and recreational variables in European NFIs
4. Identification of relevant indicators for the protective function of forests against wind storms based on the information provided by NFIs
5. Improvement of the characterization of canopy fuel loads for fire risk assessment
The use of National Forest Inventory data for the conservation status assessment of Natura 2000 forest habitats in Europe

Survey (use of NFI data, Habitat Directive) covered thirteen European countries, accounting for 62% of FHT area.

Previous RP(2007-2012) >70% ACS expert knowledge

- Yes, use of complete NFI data
- Yes, use of NFI data
- Yes, use of NFI data at least for habitat identification
- Yes, common guidelines
- Yes, use of field data
- It is being analysed
- No major changes
DISSEMINATION AND USER INFORMATION CONTRIBUTION

✓ Wide dissemination (different levels of information)
  ➢ Requirements (N/I) ➢ researchers
  ➢ decision-makers ➢ to any user
  ➢ forest managers

✓ Paper and digital format
  ➢ Paper format: key indicators
  ➢ Digital format: full information

✓ NFI's own Website. Alphanumeric and cartographic information download
THANK YOU FOR YOUR ATTENTION

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